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# Shaping Creative Verbal Behavior in Six Fourth Grade Children

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SHAPING CREATIVE VERBAL BEHAVIOR  
IN SIX FOURTH GRADE CHILDREN

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A Thesis  
Presented to  
the Faculty of the Graduate School  
Central Washington State College

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Education

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by  
Joan S. McKean  
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Colin Davis Condit

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## CHAPTER I

### THE PROBLEM AND DEFINITIONS OF TERMS USED

Underlying an attempt to shape creative verbal behavior, there must be a few basic assumptions, that, having been made, remove the problem from the realm of the experimentally untouchable, and establish the logic and legitimacy of the approach. A primary assumption, shared with the majority of investigators in creativity, (Guilford, 1959) is that all people possess to some degree, all abilities, except in the occurrence of pathologies. It follows that each person at some time performs a creative act, or in the presence of a stimulus, makes a creative response. Some secondary assumptions are derived from the Skinnerian analysis of the phenomenon of learning. It is assumed that the frequency of a response is increased if the response is reinforced. An example of shaping verbal behavior is in the development of language; a child learns to talk by emitting sounds that are reinforced by the verbal community. By assuming that every person has a probability of making a creative response, that reinforcement of a response increases the frequency of the response, and that verbal behavior is controlled by reinforcement, the rationale for this investigation was established.

## I. THE PROBLEM

Statement of the problem. The purpose of this investigation was to shape creative verbal behavior in six fourth grade subjects through the use of positive social reinforcement delivered by a mechanical talking dummy. Dummy approval was contingent on the emission of a creative verbal response to verbal stimuli provided by the dummy in a series of training sessions.

Statement of the hypotheses. The following hypotheses were proposed:

1. As a result of having received reinforcement for creative verbal response in training sessions with the dummy, the probability of making a creative verbal response for each of the six subjects would be increased, and this training would generalize to two classroom discussions, in which the six subjects would emit more creative responses after training than in a similar discussion before training.

2. The increase in the six subjects' creative verbal behavior would also appear in a written post training measure, as judged relative to a written pretraining measure.

3. With the increase in creative verbal behavior of the six subjects in the postmeasure class discussion, and the delivery of teacher reinforcement (social approval) contingent on a creative response, there would be an increase in

the creative verbal behavior of the other children in the classroom participating in the postmeasure discussions, as compared to their performance on a similar premeasure discussion.

Importance of the study. Historically, the person who has contributed to the welfare and pleasure of others through a creative act has been revered and valued for his creativity. However, the intense concern with the identification and nurturance of creative talent is a unique mid-twentieth century phenomenon. Among educators, particularly, there is an awareness of the need to recognize excellence and to develop each student to a full realization of his potential. Enlightened educators have acknowledged that there is a potential for productivity which deviates from the normal academic and institutional patterns of achievement (Yarmolinsky, 1958). It has also been shown (Torrance, 1962) that in an educational setting, it is those students who exhibit a divergency and potential not confined to academics that find themselves as "a minority of one," receiving little positive reinforcement from teachers or peers for expression of talent that is not singularly academically directed. As a consequence, creative divergent thinking is gradually extinguished, resulting in a recognizable slump in creative performance at the fourth grade level. On one hand, then,

there is a recognized need to identify and develop creative talent, and on the other hand, there is evidence to indicate that creative responses are being extinguished. This study attempted to demonstrate that creativity, or specifically, creative verbal behavior can be shaped in children who are functioning at varying levels of creativity through the use of positive social reinforcement. The implication is that creativity can be developed and maintained in an educational setting through the social approval of teachers and peers.

## II. DEFINITIONS OF TERMS USED

The term to be defined is creative verbal behavior. This phrase will be defined in parts: verbal behavior, and creative.

Verbal behavior: Verbal behavior is an operant behavior, operating upon the environment indirectly and being reinforced through the mediation of other persons (Skinner, 1957). This study was concerned with two forms of verbal behavior, the primary interest being in vocal verbal behavior, or audible speech. Of secondary interest was written verbal behavior.

Creative: Guilford (1956) identified seven intellectual factors characteristic of creative talent: originality, redefinition, adaptive flexibility, spontaneous flexibility, associational fluency, expressional fluency, word fluency, ideational fluency, and elaboration.

The three factors of originality, elaboration, and fluency were selected to define creative verbal behavior. Originality was defined as responding with a novel idea, relevant to the subject, and occurring for the first time in the context in which it takes place. Elaboration was defined as building on an idea which had appeared in a previous response. Fluency was defined as emitting a verbal response. Arranged in a hierarchy, originality was established as the highest level of creative verbal behavior, followed by elaboration and then fluency.

General method of attack. Six fourth grade children, four boys and two girls, were chosen as subjects on the basis of their teacher's subjective judgment of their creativity. One girl and two boys were identified as being "high" in creativity, and one girl and two boys were identified as being "low" in creativity. The subjects spent an average of 18 minutes a day for ten days with a mechanized talking dummy. The dummy presented verbal stimuli in a variety of forms such as word games and problem situations, each procedure presenting an opportunity for making creative verbal responses. The children were reinforced by the dummy with positive social reinforcement, in successive approximation, reinforcement being contingent initially on fluency, and gradually on elaboration and originality in response.

Prior to the training session, a discussion involving the entire fourth grade had been recorded on tape. Subsequent to training, two postmeasure discussions were taped, one being held the day after training terminated, and one two weeks later. Stories were written by every fourth grade child, pre and posttraining, to serve as written measures of creative verbal behavior. The performance of the six subjects were judged relative to the performance of the other class members on the class discussions and written pre and postmeasures according to criteria for creativity established by the investigator for use by three independent judges.

### III. ORGANIZATION OF THE REMAINDER OF THE THESIS

Subsequent chapters will be as follows: Chapter II, review of related research and limitations of previous studies; Chapter III, description of procedure and method; Chapter IV, discussion of the data and implications for future research; and Chapter V, summary and conclusions.

## CHAPTER II

### REVIEW OF RELATED RESEARCH

Dating from the early 1950's, research in creativity has been copious in quantity, diverse in approach, and non-definitive in conclusiveness. Yamamoto has attributed these characteristics of creativity research to the philosophical differences among the researchers in terms of how these differences define what the investigator expects to find. At one extreme are Maslow and Rogers, who maintain that creative acts cannot and should not be analyzed or the creative process might be destroyed. Somewhere in the middle is the kind of research done by men like MacKinnon, who attempt to investigate and analyze the whole man. At the other extreme, and slightly more rare, are experimentalists, representing the positivistic elementaristic approach (Yamamoto, 1965).

In this review, an attempt has been made to sample the major relevant areas of research in creativity. The studies are only indirectly related to the problem of shaping creative verbal behavior with positive social reinforcement, as an identical study was not found in the literature. Investigations cited are: Guilford's pioneering work in creativity, a representation of studies done with adult subjects, a sampling of typical research with children,



including (a) investigations of IQ scores as correlated with measures of creativity, (b) personality characteristics, (c) identification of the creative child, and (d) the creative child's plight in the schools. The review terminates with a brief survey of experimental investigations. The research reviewed was supportive to this study largely in the selection of population and in design of training procedures.

The second part of reviewed research is a brief summary of relevant literature on operant conditioning, including Skinner's original work on verbal behavior, and a sampling of shaping of verbal behavior in children and adults, in addition to a child study using a mechanized dummy as the reinforcer.

## I. LITERATURE ON CREATIVITY

Guilford (1950) laid the groundwork for creativity research when he named and defined divergent thinking as one of the five major factors of intellectual ability. Divergent thinking, in opposition to convergent, was defined as a searching or going off in various directions. Mention has been made in Chapter I of his identification of the intellectual characteristics of creative talent. Guilford recognized a creative act as an instance of learning, in that it represented a change in behavior due to a response to a stimulus.

Definitions of creativity. In order to investigate creativity, first it is necessary to define it, and quite logically, definitions have been as varied as approaches to the problem. Mednick and Mednick, experimentalists (1955) defined creative thinking as the forming of new combinations of associative elements. The combinations had to meet specified requirements in some unusual way and the more remote the elements of the new combination, the more creative the process or solution. Torrance (1962) has defined creativity as the process of forming ideas, testing hypotheses, and communicating results, with the production of ideas contributing to the pleasure and welfare of others. Drevdahl (1956) described creative thought as the goal directed, easily flexible manipulation of knowledge in a wide variety of original ways. Wallen (1964) distinguished originality as any response that is atypical or unusual, as compared with creativity, which is unusual behavior that is useful to society.

Research in creativity among adults. Research using adult subjects, judged to be creative on the basis of having performed a creative act, has yielded a variety of information on characteristics of personality and intellect common to creative adults. Barron (1953) found his adult subjects to be disposed toward an integration of diverse stimuli, responsive to impulse and emotion, and personally dominant and

self-assertive. These subjects were also found to be verbally fluent, persuasive and able to communicate effectively. Hammer (1964) confirmed Barron's findings, and also cited a tolerance of ambiguity and a lack of need for discipline and orderliness as being characteristic of the creative young adult. The studies of Barron and Hammer are typical of the investigations that have been done on creative adults.

Research in creativity among children. A large portion of the research in creativity with children has centered around the relationship of scores on intelligence tests with various measures of creativity. Among the available instruments used in research for measuring creativity are the tests of Guilford, Torrance, and Getzels and Jackson. Getzels, Jackson, and Torrance (1962) have found that there is a low correlation between tests of creativity and tests of intelligence. They conclude that there is little relationship between creative thinking abilities and generalized abilities as assessed by measures of intelligence. Ripple and May (1962) found that scores on intelligence tests have a higher correlation with creativity test scores in a heterogeneous sample of children, but agree with Getzels, Jackson and Torrance who have stated that if intelligence tests are used exclusively in assessment of ability, 70 per cent of those who score highest on a measure of creativity would be missed.

Tests of creativity have been criticized by some investigators. Thorndike (1963) has suggested that the common core running through the various tests of creativity has not been identified, and children scoring high on a battery of creativity tests should not be labeled globally as creative, but rather specifically, such as verbally fluent. Research on intellectual characteristics of creative children relative to their less creative peers indicate that they have more humor, more fantasies, and more ability, along with greater tendency, to toy with ideas. Clark (1965) found divergent thinkers to have greater verbal facility, and more imaginative, fanciful productions. The divergent thinkers' perceptual processes are mature and controlled, but not conventional. Children characterize their creative peers as having "wild and silly ideas" (Torrance, 1962). Torrance (1962) has found that the creative child often does not measure up to the criteria of "well-rounded," and may even show deficiencies in some abilities such as reading.

Having stimulated much research is the question of who is best able to make subjective judgments of creativity. The judgments of parents and peers have received some attention, but the most extensive research has been carried out on teachers' judgments. Clark (1965) has stated that teacher nominations of those with creative potential are notoriously biased towards high evaluations of convergent

thinking. Teachers' ratings of a variety of traits have indicated that teachers prefer the student with the high IQ to the highly creative student, and that the creative student is often actually rejected. The creative student has been found to have a self-ideal that correlates negatively with the teacher's approved ideal (Reid, 1959). Holland (1959) has suggested that teacher ratings are more useful as predictors of academic and leadership potential than of creativity. A few researchers have disputed these findings. De Mille (1963) has criticized the Getzels-Jackson study for the use of fictitious groups. Subjects were divided into a group scoring high on a creativity test and a group scoring high on an IQ test. These subjects who scored high on both measures were excluded from the study. It seems likely that, given a choice, a teacher might well prefer the subjects who excel in both directions. Another deficiency of teacher judgment studies is that an inference of inability to judge creativity is based on teachers' expressions of preferred student traits. Teachers have not been asked specifically to select their most creative students, but rather to establish trait rankings. Conclusions regarding ability to recognize creativity cannot be drawn legitimately from this information.

Investigations of elementary school children. Investigators of creativity in elementary school children have been surprisingly unanimous in their findings on the progressive decrease in children's creative activities, and the classroom ostracism of the creative child. Henry (1950) has stated that during the early school years, which he labels as a period of "pre-creativity," creativity is probably associated with responses that are not customarily reinforced. Torrance (1962), among others, has plotted a growth curve for creative development showing a sharp decline in creativity at the fourth grade level. Explanations for this decline are numerous but highly speculative. The fourth grade is a period when pressures toward socialization are strongly felt, and a cautiousness develops in picking that behavior when receives the approval of authorities (Torrance, 1962). There is also considerable pressure from peers toward conformity (Taylor, 1964). A child of this age, according to Sullivan (1962) is likely to see those around him as possible sources of humiliation, anxiety, and punishment, with respect to that which is communicated, which naturally reduces freedom of response and most especially, the production of original ideas. Torrance (1962) lists the problems of the creative child in being a minority of one as (a) having to cope with society's dislike of divergency, (b) alienation of peers through expression of talent, (c) awareness of pressure to

become a "well-rounded" personality, (d) divergence from sex role norms, (e) a desire to learn on one's own, and (f) a need to search for one's uniqueness.

Experimental research in creativity. Experimental studies of creativity are remarkable because of their scarcity. Contributions by experimentalists to the vast amount of creativity literature have been minimal. For the most part, experimentalists in creativity research have chosen to investigate discrete behaviors. There are those who would judge this kind of research irrelevant and inappropriate to the highly complex subject of creativity. Typical of the experimental approach is Maltzman's (1960) work on the training of originality. He has found that one difficulty in facilitating originality is that original behavior may occur too infrequently to be reinforced. His technique to facilitate the occurrence of original behavior is to evoke uncommon responses by asking for different responses to repeated presentations of the same stimulus words in a free association situation. He has found that subjects with training are more original on a new word list than subjects without training, and that the evocation of different responses to the same stimulus increases a subject's general disposition to produce uncommon responses. Rosenbaum, Arenson and Panman (1964) attempted to assess the effects

of Maltzman's training procedure on originality in contrast to the effect of instructions to be original.

They found that those subjects instructed to be original showed greater productivity and originality on post-training tasks than those receiving Maltzman-type training but no such instructions.

## II. RESEARCH ON SHAPING VERBAL BEHAVIOR

Skinner, in Verbal Behavior (1957), proposed that the amount of reinforcement accorded one's verbal behavior as a child is later evidenced at one extreme in the adult who is very voluble as a result of much reinforcement for verbal behavior, to the strong, silent type, functioning at the other end of the reinforcement continuum. An example of the effects of differential reinforcement cited by Skinner is the troubadour, whose verbal behavior is quite divorced from stimulus control. He repeats stories he has never heard and talks about things he has never seen, because his behavior has been shaped by reinforcement being delivered contingent on fanciful and amusing verbal behavior. The listeners, or audience, control the kind of responses the speaker makes; consequently, some verbal behavior is more likely to be emitted with one kind of audience than with another. Generalized reinforcement has been used deliberately to strengthen particular forms or themes in the verbal behavior



of a subject (Greenspoon, 1954). A socially appropriate verbal repertoire was established, using the techniques of operant conditioning, by Wolf, Mees and Risley (1965) in Dicky, a child of three and a half. Previously, Dicky had no socially acceptable verbal repertoire, nor was his behavior, verbal or nonverbal, under verbal control. In order to establish a verbal repertoire, initially it was necessary to use food as a reinforcer, but after a period of time, generalized reinforcers of adult attention and approval were effective in maintaining and expanding Dicky's verbal behavior.

Some final research relevant to this study in shaping creative verbal behavior was the work done by Baer (1962, 1964) in his investigations of reinforcement control of generalized imitation in nursery school children, and behavior avoiding reinforcement withdrawal. In these studies, Baer used a mechanized talking dummy as the reinforcer. The dummy would deliver positive social reinforcement by attending to the subject, contingent on the emitting of a desired response. Attending to the subject was accomplished by the dummy raising his head from his chest and talking. Baer's rationale for using a dummy as reinforcer was that he felt the dummy would be better able to deliver standardized reinforcement, not being subject to inadvertently reinforcing through a smile or a raised eyebrow, in the manner of an adult

experimenter. He also assumed that in interaction with a dummy, a child would not generalize from the threatening stimulus aspects sometimes involved in interaction with an adult, thereby lessening the complexity and variability present in adult-child relationships.

### III. LIMITATIONS OF PREVIOUS STUDIES

Research in creativity done in the last decade has resulted in an abundance of data. The limitations of previous research are not so much in the inadequacies of the studies, but rather in the researchers' reluctance to use available knowledge to study creativity creatively. To continue to correlate scores of intelligence and creativity tests, to administer batteries of personality tests, to assess sociometrically the status of the creative child in the classroom, or to free associate to wordlists no longer seems too fruitful. The ultimate goal of creativity research is to facilitate the nurturance of creativity. It would seem time to take a tentative step in that direction. Shaping creative verbal behavior in elementary school children is an attempt to combine ideas towards a new approach to the investigation of creativity. In the following chapter on method and procedures, the utilization of data from previous studies will be apparent.

## CHAPTER III

### METHOD

#### Subjects

This chapter presents a description of the children used as experimental subjects, the apparatus employed in training, the training procedures, the discussion pre and postmeasures, the written pre and postmeasures, and the techniques used for analysis of these measures.

Four fourth grade boys and two fourth grade girls served as subjects. The subjects were enrolled at the campus school, Hebeler Elementary. All six subjects were children of college faculty or staff members.

The fourth grade teacher was asked to select the three most creative and the three least creative children in his classroom. With the exception of one child who could not serve as a subject, because she was a member of the experimenter's family, the six children chosen for the study were those who best met the teacher's subjective criteria for high or low creativity. Although the bulk of research would not support using a teacher's judgment of creative children, the deficiencies present in studies disclaiming a teacher's ability to judge creative students provide a basis for defending teacher judgment. The teacher was familiar with and interested in creativity research.

## Apparatus

The apparatus was a dummy named Kelly, who sat on a chair placed level with the chair for the subject. Figure 1 shows Kelly and a child typically positioned. Kelly had a movable jaw which allowed a reasonably realistic portrayal of speech. One of Kelly's hands rested on a bar press, which was not used in this study. The bar press did not seem to be a distracting stimulus to the subjects. A loud-speaker was mounted in the front of the dummy's chair. The experimenter spoke through the loud-speaker and synchronized the dummy's jaw movements from a control room adjacent to the dummy room and separated from it by a one-way vision screen, through which the subjects could be observed. A panel mounted on the wall of the control room directly beneath the vision screen allowed the experimenter to manipulate the dials controlling voice tone, volume, and jaw movement while speaking through the microphone and observing the subject.

The dummy room was painted white. On one wall of the room were two large, colorful paper figures, cut out in an abstract representation of children playing. Around the figures on the wall were circles of paper in various colors and sizes. The electrical cord necessary for the dummy's operation was disguised as a stem to a large paper flower which covered a hole in the wall. The room was furnished

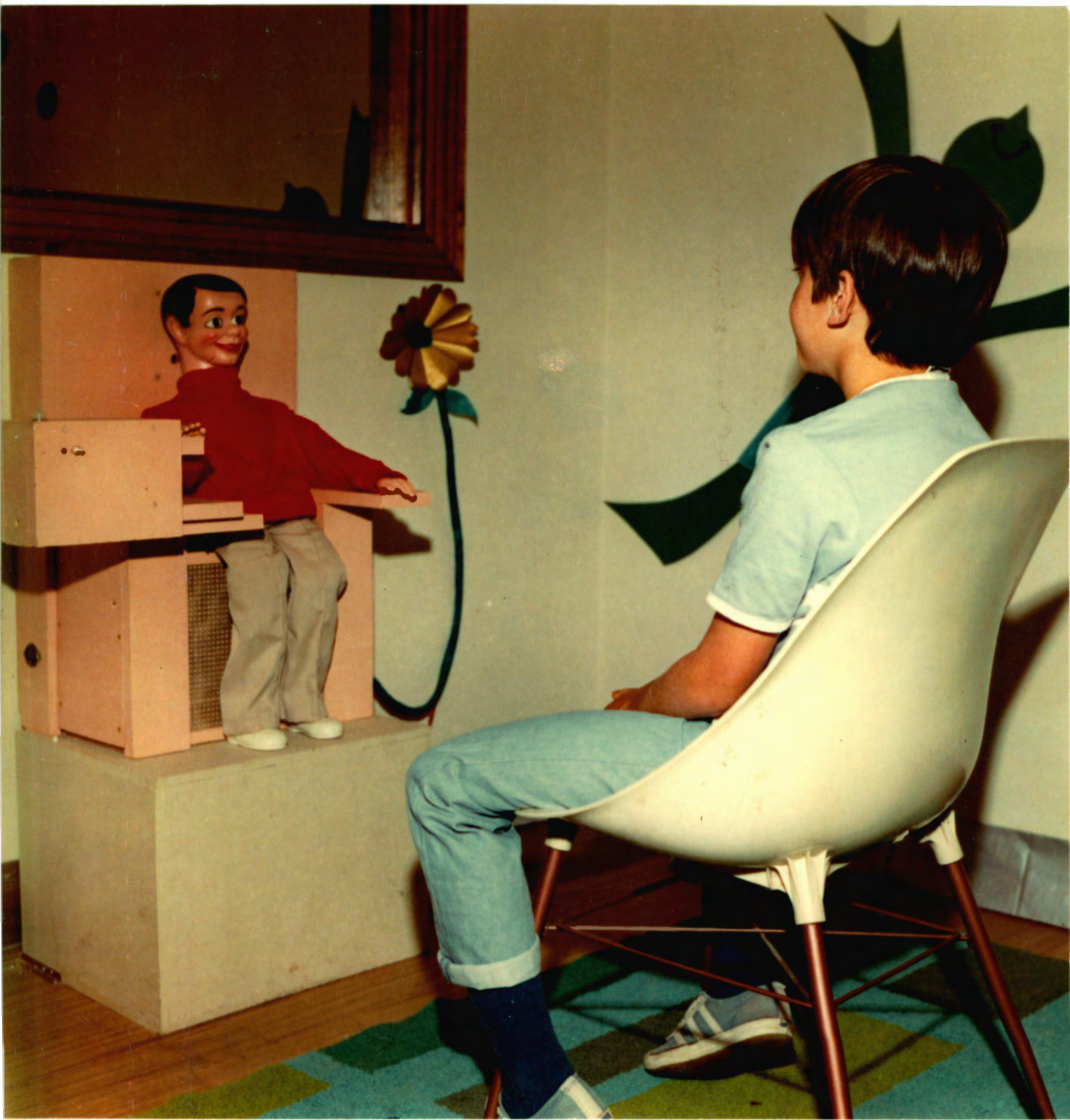


FIGURE 1

KELLY, THE DUMMY, TALKING  
TO A CHILD

with a white contour chair, a gaily colored area rug, and a book shelf, decorated in bright colors and serving the function of providing a place for the tape recorder.

All sessions were tape recorded. The subjects were told at the first session that they would be recorded. Recording was a common classroom procedure for them, and there was nothing in their behavior to indicate that they were anxious about or distracted by this procedure.

### Training Procedures

Each subject had ten sessions with the dummy; a session lasted approximately eighteen minutes. The subjects were run in rotation, changing the time of the session each day. Subjects were brought from the classroom to the dummy room by one of four assistants, working on a randomized schedule for the ten days. An assistant would bring the subject to the room, say something like, "Kelly wants to talk to you today," turn on the tape recorder, and leave. At the end of the session, the assistant would return the subject to the classroom. Each assistant kept a record of the subjects' responses and any unusual events that took place on leaving and returning to the classroom. During the time that the subjects were in training, their classmates were engaged in the regular classroom activities of studying French and going to the library. The assistants were free to observe the subjects through the one-way glass during sessions.

The first day of training, Kelly used a routine introduction to himself, the room, and the expectations for interaction with the subjects. On the following days, the first one or two minutes of each session varied with the subject. Kelly greeted the child and then initiated a short conversation of a personal nature, asking what the child did after school the day before, commenting on a pretty dress, and so forth. Following this short exchange, each subject was presented with the same procedures, according to the script. The procedures were as follows:

Day 1. Hi. I'm Kelly. What's your name? I'm glad that you have come to see me. What do you suppose that we are going to do? I would like it if we could be friends, just talk, play games and have a good time. I don't move around like you do, but I can talk, so the games I play are the ones that can be played with words. I like games that make you use your imagination. That's fun. Especially when you can be as bold and free as you want, even silly if you feel like it. And that is the way we can play. How does that sound to you? Okay, let's play some games. Maybe just a simple one at first. Procedure A. Here is what we will do. You can be "it." I'll say a word, and you think of a word that will rhyme with the one I have used. Like bug, rug, lug, glug, hug, mug, plug. Think of as many words as



possible that will rhyme with each word. (a) Boy. (b) Pill. (c) Hop. (d) Good. (e) Run. (f) Fiddle. (g) Burn. (h) Tune.

Procedure B. We know things by the names that are given to them. People have names. Towns have names. Products have names. Names are interesting. Some names give us information about what they refer to, and some just don't really tell us much, except that they give us a feeling about the person or thing. I'll bet that in real life you have heard some interesting names, names of real people, or places or things. There is a doctor in Seattle named Doctor Doctor. Can you think of any real names that are fun or interesting? How about some stories you have read? Have you read a book with an unusual title? At Christmas time, you have heard the story about a man named Ebenezer Scrooge. What kind of man was he? Did the author think of a name that sounded just right for a stingy mean old man? Now, I want you to make up some good names for people and things. Use your imagination. (a) What would be a good name for a town where the sun never shined and nobody ever laughed? (b) What would be a good name for the villain, the bad guy, in a Western movie? (c) What would be a good name for the hero, the good guy? (d) What would be a good name for the Jolly Green Giant's wife? (e) What would you call a sundae that



had three flavors of ice cream? (f) What would you call the smartest man in the world? (g) What would you name a candy bar that was gooey and sweet, but as good for you as carrots and milk?

Day 2. Procedure A. To begin with, today, just for fun, I want you to think of as many uses for a tin can as you can. Try to think of uses that other people probably wouldn't think of (Torrance, 1965).

Procedure B. Let's pretend that you had a very special job. You were in charge of making improvements on things that people use everyday. People came to you with things that they wanted changed because you were very clever and imaginative and could think of ways to change things that nobody else could think of. There are some main ways of changing things. You could add something or take something away. Or you could make more of it or divide it. You could make it bigger or smaller or of different material. Or take it apart and put it together differently, or put it to another use, as you did the tin can (Torrance, 1965). So, as this clever person, you used many ways to change things, and someone came to you and asked you to improve a coffee cup. How would you do this? (a) a drinking fountain, (b) TV set, (c) vacuum cleaner (d) books.

Day 3. Procedure A. Let's start through the alphabet, and I'll say a letter, then you think of all the things that you can eat or drink that begin with that letter. A, B, C, D, E, F.

Procedure B. I have thought of a plot for a story, but I don't know how it should end. I'm sure that there are many ways it could end, and I would like it if you would help me think of all the possible endings and then maybe we could pick the best one. Here is what I have so far: Professor Sara Bellum, world famous scientist, is working in her laboratory. She has before her five test tubes filled with chemicals and substances whose properties and possibilities are unknown to mankind. She decides to combine them to see what amazing thing will result. She adds the ingredients of the first tube to the second, and this mixture to the third, and the combination of the three tubes to the fourth and then, slowly, fearfully, and expectantly, she puts this mixture into the fifth and last test tube and then.....now you think of an ending.

Day 4. Procedure A. Today let us pretend that you had limitless magical powers and that you could change anything to make it as you wanted. If you were this super magician, tell me: (Torrance, 1965) (a) what you would make sweeter so that it would taste better. (b) what you would make smaller so that it would be nicer. (c) what you would make louder

so that it would be more pleasant. (d) what you would make round so that it would be more comfortable. Now think of some of these things that you have worked your magic on and changed and tell me how the changes in them might make your life different.

Procedure B. In order to solve problems or just to learn things that are interesting, exciting or amusing, a person needs to ask questions. Sometimes you don't have the opportunity to ask all the questions that you can think of, but you have to pick out the ones that best serve your purposes. Let's pretend that you are the interviewer on a television program, where people who are interesting because of what they are or what they have done come to be asked questions. You, as the interviewer, want to ask questions that will entertain and inform your audience. Suppose that for each guest you interview you can ask only three questions. I will describe some make-believe guests and you tell me the three questions that you would ask them. (a) the mother of twelve children who has just been named "mother of the year," (Torrance, 1965) (b) a man who is building an arc like Noah's and is looking for two animals of every kind. (c) a twelve year old boy who is in his first year of college. (d) a scientist who says that he can understand the language of porpoises. (e) a hermit who lives on an uninhabited island. (f) a doctor who says that he can cure all diseases with vinegar and honey.

Day 5. Procedure A. We have been playing a lot of games with words, but I know one that we haven't done yet. Sometimes it is fun to make up words. I'll bet that you have read some stories or poems that used made-up words which sounded just right and you knew what the word meant although you had never heard it before. I would like you to make up some words of your own. What would be a word to describe something that was very light, a word that sounds light? (a) heavy (b) wet (c) soft (d) smooth.

Procedure B. Do you know what a simile is? Similes are something said that points out likenesses or similarities between things. You have heard expressions like sharp as a tack or snug as a bug in a rug. When we say things like that we are using similes. Similes usually have the words as or like in them as these are the words used in making a comparison.

Let's make up some similes. I will start a comparison and you can finish it. Try to think of new comparisons that you have never heard before. (a) flat as (b) funny as (c) strong as (d) weak as (e) hard as (f) wiggly as (g) blue as (h) white as (i) black as (j) graceful as (k) speedy as.

Day 6. Procedure A. If you wanted to describe the weather in Ellensburg to someone, what would be one of the first things you would tell about? Imagine a city that was as windy as Ellensburg and windier, all the time. Pretend

that you were the chief planner and you were to design everything in the city and everything that people used that was exposed to this tremendous wind, so that life in the city would be as pleasant and safe and just generally livable as possible. Tell me about some of the things that you would do for your city.

Procedure B. I hear that you have been studying about animals. Let's play some games involving animals. Most of the animals that we know have just two eyes. Can you imagine one with five eyes (Torrance, 1965)? What would he look like? How might he make use of all of his eyes? What happens over thousands of years to those parts of animals which are not useful? Can you tell me about some animals which have unusual characteristics that serve the animal well in living in its environment?

Procedure C. Invent an animal just for the fun of it. Maybe an animal that lives on another planet. Tell me what it is like, and what its environment is. And tell me how his unusual characteristics are related to where and how it lives. Name it, if you want.

Day 7. Procedure A. I have another story that I would like you to help me finish. It goes like this. Monty Huguenot, a boy of twelve, wakes up one morning to a room filled with color and design, changing and blending from hue

to hue and shape to shape, like looking through an enormous kaleidoscope. He rubs his eyes, looks again, and sees still another beautiful blend of color and shape filling the room. Suddenly.....

Procedure B. It is fun to make comparisons. When people think, they are often making comparisons or seeing relationships between things. You have a good imagination, so today why don't you try to imagine what will be the most important differences between living now and living one hundred years from now. (Torrance, 1965).

Day 8. Procedure A. Sometimes things happen, people are faced with situations that present a problem, and the quicker you can think and the more clever you are, the faster and better the problem gets solved. I want to give you an imaginary situation with a problem, and then I want you to solve it. Suppose that the government purchased all of the salt available in the stores so that there was none to be bought anywhere in this country. How could you go about getting some salt?

Procedure B. Suppose that you are out camping in a very beautiful spot, with lots of lovely trees, ferns, flowers and things. You haven't brought a camera with you. You would like very much to paint or draw some of the beautiful scenes to have something to take home with you to remember them by,

but you didn't bring any art materials. Can you think of how to record all that beauty? Think of as many ways as possible.

Day 9. Procedure A. Have you ever been to the ocean? You have read about oceans and beaches, I would guess. I would like you to think of all the things that can be found on a beach. And for everything, or every combination of things you think of, I would like you to think of something unusual you would do with what you found.

Procedure B. I am going to say two words and when you hear them you will think that they have nothing to do with each other, and you will be right. But there is a way of relating these two unrelated words. That is by thinking of a third word that goes with each of the two unrelated ones, a third word that makes good sense when it is combined with either of the other two. I'll give you an example. If I said snow and house, what would be a word that would go equally sensibly with each of these words? (White) Okay, now think, and if you need a hint at first, I'll help, but soon you will need no help. (a) soda and corn (pop) (b) paint and hair (brush) (c) man and baseball (bat) (d) cracker and jumping (jack) (e) land and Walt (Disney) (f) dud and shake (milk) (g) hug and grizzly (bear) (h) ice cream and nose (cone).

Day 10. Procedure A. You have done very well finishing my stories. I would like you to help me with just one more.

It goes like this: Mona Guggenheim, a little girl of ten, for a very special treat was taken to a museum one rainy Saturday afternoon to spend the day enjoying all the beautiful art treasures, paintings, and relics. First, she visited a room filled with Indian treasures. She saw canoes, arrowheads, tomahawks, and a large statue of an Indian brave in full dress. As she left the room, she could have sworn that she heard the faint whisper of soft leather moccasins on the hard tile museum floor. Next, she visited a room filled with famous paintings. Especially she liked one that showed a lady sitting on a clam shell in the middle of a pond. As she went out the door, there seemed to be the tinkly splash of water sounding in the background. Then she was in a room filled with statues of famous men. There was George Washington, Bluebeard, and right near the exit, a large statue of Columbus, hand to his eyes, map and compass under his arm. As Mona was leaving the room, she heard a very deep voice say, "I'm sorry, but I seem to have dropped my map, and I can't find my way without it." She turned around and.....

Procedure B. Remember the day that you were the famous inventor changer, and people came to you with things they wanted improved? Well, today, just for a minute, you be that person again and tell a very dirty little boy who doesn't



like to take baths how you would improve his bathtub. (a) a dentist who wants his office and all his equipment to be improved so that children will never be frightened when they come in to have their teeth fixed.

Procedure C. Remember when I asked you to make up a name for a candy bar that was very gooey and sweet, but good for you, too? Well, pretend that you were the manufacturer of that candy bar, and you wanted to advertise on TV so that children would want to buy your candy bar, but you also wanted to convince the mothers that something like a candy bar could be nutritious and healthful as milk, spinach, and all those things. Make up a short commercial saying what you would say so that mothers and children would go out and buy your candy bars by the dozens.

The presentation of each procedure was followed by instructions to be bold, imaginative, and thoughtful. The phrasing of these instructions were not routinized, but the content was constant. If a subject did not understand a word that Kelly used, or indicated that he was not certain about what he was being asked to do, Kelly elaborated until the subject indicated that his question had been satisfactorily answered.

On the tenth day, after having finished the procedures, Kelly told the children that this was their last day together,

and that he had enjoyed spending time playing games and talking to them. He told each subject that he or she had been clever, imaginative and thoughtful in the way that they had played, and he hoped that they would continue to use these abilities in other settings.

Reinforcement procedures. Kelly reinforced the subjects for emitting the desired verbal behavior with positive reinforcement in the form of social approval. Kelly's delivery of social approval was not standardized, but was expressed spontaneously in various forms. For the most part, subjects were reinforced by Kelly's saying, "That was very clever of you," or "Good, good," or "I really like that." Generally, Kelly positively reinforced humorous responses with laughter.

Shaping of creative verbal behavior was done by reinforcing successive approximations. During the first three days of training, subjects were reinforced for making response. As training progressed, it was possible to withhold reinforcement until the subject could produce an original response, or elaborate on a previous response. Reinforcement was delivered immediately upon the completion of a response. The scheduling of reinforcement was continuous, in that every creative response was reinforced. However, since periods of time between reinforcement varied, and number of responses to a creative response also varied, reinforcement was actually

delivered on a mixed variable-ratio, variable-interval schedule. Procedure A of each session was usually a relatively simple exercise, allowing the subjects to warm up and to receive reinforcement at the beginning of a session.

### Measures.

Discussion premeasure. Before the training of the subjects began, a class discussion involving all fourth graders was tape recorded. The discussion was led by the teacher and was a typical class discussion, except that the experimenter provided the topic. The following instructions were given to the class by the teacher:

Today we are going to talk about a Utopia. Who knows what a Utopia is? Well, a Utopia is the best of all possible worlds. It is a place to live and a way of living that provides the people with the best of everything. Today we are going to plan for education in our Utopia. I want you people to design the very best educational system that you can. Think about what you would teach, how you would teach and who would teach. Okay, now give this some thought, use your imaginations, and think of the best way of educating the people in a Utopia.

First discussion postmeasure. The day after the last training session, another class discussion was tape recorded, identical to the premeasure discussion except for the introduction of another aspect of Utopia. The following instructions were given to the class by the teacher:

A couple of weeks ago we discussed education in a Utopia, an ideal place. Remember that we said a Utopia was the best of all possible worlds. In the last discussion we were concerned with education in a Utopia. In our design of a Utopia we want to provide for the best possible life for the people who live there. We want them to be well educated, and you provided many good ideas as to how this might best be accomplished. Not only do we want the people to have knowledge, we want them to be healthy and happy. One of the ways to promote the health, happiness and general welfare of the people in this Utopia is to offer them a really fine recreational program. That is, we want them to have a multitude of things they can do in their leisure time that will be fun, interesting, exciting, and stimulating. Now what I want you people to do is to outline this recreational program. What will you want to have in this program so that the people living in this ideal world will have many wonderful things to do in their free time? Use your imagination. Be as clever and original as you can. Don't be afraid to combine ideas in a way that has not been done before.

Second discussion postmeasure. Two weeks after the first postmeasure discussion, a second postmeasure discussion was tape recorded. The topic was the population in Utopia. The following instructions were given to the class by the teacher:

So far we have spent two discussions planning our Utopia. First we considered education and you people contributed some interesting ideas as to what would be an ideal way of educating in Utopia. A couple of weeks ago, we considered the matter of recreation. I thought that you had a really fine discussion going. You were coming up with ideas that were original, imaginative, and possibly very useful to this Utopian community. You also refrained from evaluating and criticizing each idea as it was submitted. Today I would like to have you think about and discuss another aspect of our Utopia. This will be our last planning session for Utopia. Today the topic is the population of Utopia. Remember that the most important part of Utopia is the people who live there. In discussing education and recreation we had the people in mind, thinking of ways to provide for their health and happiness. But given a large group of people, there will be some who will need special attention. There will be old people, sick people, people who don't have enough money to live, homeless children, people who have some physical or mental defect, people who have not obeyed the laws and have been punished. What I want you to do is think about the kinds of problems in our Utopia. Remember, a Utopia is the best of all possible worlds for the population, the people. How would you make it so?

Written pre and postmeasures. Two written measures were taken, one preceding the subjects' training period and one following two days after their last session. On each measure, the teacher asked every member of the class to write an imaginative story. The children were told not to be too concerned with spelling and grammar, but instead, to produce the most original story that they could write. A list of titles, which the teacher gave to the class, was provided for each measure. The teacher pointed out to the children that each title was concerned with a person or animal who had a divergent characteristic, something which made the main character unlike anyone else. The children were encouraged to make up their own titles, using main characters with divergent characteristics. The children were allowed thirty-five minutes of a class period to write each measure. Premeasure suggested story titles were:

1. The dog that doesn't bark.
2. The man who cries.
3. The woman who can but won't talk.
4. The lion that doesn't roar.
5. The flying monkey.

Postmeasure story titles given to the class were:

1. The penguin who sang opera.
2. The kangaroo with a zipper pocket.
3. The boy who ran for president.

4. The child who slept standing up.
5. The lazy ant.

### Techniques of Measure Analysis

Discussion measures. Two undergraduate students and one graduate student served as judges for the discussion measures. The criterion for judge selection was chiefly availability. The three tapes of the one pre and two postmeasures, averaging fifty minutes in length, were played back and judged independently by each of the judges.

Every response made by each class member was evaluated. The judges did not know which children were in the experimental group. The criteria used in judging had been presented in an hour-long training session with the judges. During this session, the criteria were discussed and a short practice tape was played, giving the judges an opportunity to use the criteria before judging the measures. The criteria consisted of three counts: (a) fluency, (b) elaboration, and (c) originality. A fluency count was entered for each response a child made. A response was defined as an uninterrupted unit of verbal behavior that could be composed of one or several sentences, as long as they were delivered consecutively. An elaboration count was entered if a child made a response to an idea that had been presented in a previous response made by another or by himself. An elaboration

entry indicated that a child had built on an idea that had been presented prior to his response. The judges were instructed to listen for the child's own identification of an elaboration, as quite frequently a response would be preceded by a phrase such as "building on Sammy's idea....." A judgment of originality was defined in terms of statistical infrequency. A response was original if an idea was presented that was new, that had not occurred in the discussion up to the time the original response was made. In order for a response to be judged original, it had to be relevant to the discussion. If a single response included both an elaboration and an original idea, the original response superseded the elaboration response, and only an originality entry was recorded. Each response received a fluency count. If a response was irrelevant it was entered only as a fluency count.

Written measures. One undergraduate and two graduate students served as judges for the stories. These judges were also selected on the basis of availability. All stories were typed and coded by a disinterested secretary, so that judging of the measures was done blind. The judges were given the list of criteria and an opportunity to question any points that were not clear before judging the stories. The judges worked independently. The criteria for judging stories was the following ten-point scale:



1. Emotion ascribed to the main character, by having the character express it directly as in "I feel sad," said the sowbug, or by having it ascribed indirectly by the author, as in "Poor Tom, he looks torn with rage." One point for each different emotion ascribed to the main character.
2. The use of similes and metaphors, saying something is like something else: "That Sandy is like a great toad," or saying something is something: "Alice is a mealy worm." One point for each simile and metaphor.
3. Explanation of the main character's divergent characteristic, as to why or how he got that way: "The prince croaked like a frog because he was under an evil spell." Five points.
4. Development of the plot around the main character's divergence, that is, did something happen to him, or did he do something that was directly related to or because of his divergence. Five points.
5. Humour, was the story funny. (a) a play on words: "The little boy put ice down his daddy's neck because he liked cold pop," 2 points, (b) emphasis on those aspects of a situation which are ludicrous, silly, "far out": "when asked why she couldn't talk, the lady who couldn't talk said it was none of anyone's business." Two points. (c) exaggeration in verbal or physical responses of a character: "I'll die, I'll faint, I'll perish if you don't eat your breakfast," said the mother. Two points. A total of six possible points for humour.

6. Non-stereotyped beginning, any beginning that does not include the words "once upon a time" or "there once was a". Five points.
7. Original topic about a character with a divergent characteristic, not one of the supplied titles. Five points.
8. Each character given a proper name: Jane, Dick, etc. One point for each name.
9. A character assigned a symbolic name, "he was a Canadian Mounty, and his name was Granite Outcrop." Five points.
10. Clarity. Can you follow the story, get the gist of it. Are there few enough irrelevancies that the story has coherence. Five points.

Using the previously described criteria, the performance of every member of the fourth grade class was judged on each of five measures. The performance of the six experimental subjects was judged relative to the rest of the class members on all pre and postmeasures. The following chapter will present the results of the data analyses and the inferences that can be drawn from the results.

## CHAPTER IV

### RESULTS

Judges' ratings of the written and discussion pre and postmeasures yielded data which were analyzed with a repeated measures analysis of variance design (Winer, 1962). This chapter reports the results of an analysis of the six experimental subjects' performances on the written measures as compared to the performance of the rest of the class used as the control group. Data are presented comparing the six subjects on fluency, elaboration, and originality in pre and post discussions with their classmates' performance on these counts. Significant differences in scores between the experimental and control groups are discussed in relation to support of the three hypotheses of the study, and some inferences are drawn regarding shaping of creative verbal behavior.

Table I shows the results of an analysis of the six experimental subjects' fluency performance in the discussion measures as compared to the fluency performance of the rest of the class members.

Neither the six experimental subjects nor the rest of the class members showed a difference in fluency between pre and post discussion measures beyond the difference that one

TABLE I

PERFORMANCE ON FLUENCY IN THE DISCUSSION MEASURES,  
BY GROUPS, EXPERIMENTAL AND CONTROL

SIX SUBJECTS, EXPERIMENTAL GROUP						CLASSMATES CONTROL GROUP				
SOURCE	SS	df	MS	F	P	SS	df	MS	F	P
Between	331.12					2682.48				
Within	38.66					366.00				
Treatment	.44	2	.22	.058	>.05	40.35	2	20.17	1.98	>.05
Residual	38.22	10	3.82			325.65	32	10.17		

would expect by chance. These data do not support the hypothesized increase in the fluency criterion of creative verbal behavior on the post measures of the experimental and control groups.

Table II summarizes the analysis of experimental and control group performances on elaboration in the discussion measures.

TABLE II

PERFORMANCE ON ELABORATION IN THE DISCUSSION MEASURES,  
BY GROUPS, EXPERIMENTAL AND CONTROL

SIX SUBJECTS, EXPERIMENTAL GROUP					CLASSMATES, CONTROL GROUP				
SOURCE									
Between	74.95				249.93				
Within	20.67				276.00				
Treatment	1.45	2	.72	.37 >.05	66.98	2	33.49	5.12	<.05
Residual	19.22	10	1.92		209.08	32	6.53		

The six experimental subjects did not perform at a significantly different level of elaboration from pre to post measures. It was hypothesized that the verbal behavior of the six subjects would show increased elaboration on the post measures; this expectation was not supported by the data.

The performance of the control group showed a difference on the elaboration criterion which reached significance at the .05 level. A Duncan's New Multiple Range Test (Winer, 1962) was run, and significance was found between performance on the premeasure and the second postmeasure, the elaboration counts being higher on the pre and second postmeasures than on the first postmeasure. It was hypothesized that the control group would emit more verbal responses scored as elaboration in the postmeasure discussions. The possible significance of these findings will be considered at greater length in the discussion of results.

Table III presents a summary of the analysis of the experimental group's and control group's performance on the originality criterion.

The difference between discussion measures on originality for the experimental group did not reach significance. The control group's performance on originality between discussion measures reached significance at the .05 level. A Duncan New Multiple Range Test (Winer, 1962) showed the performance on the first postmeasure discussion to be significantly higher than the premeasure and second postmeasure performances. While elaboration was greater on the first premeasure and second postmeasure discussion, originality reached significance on the first postmeasure discussion.

TABLE III

PERFORMANCE ON ORIGINALITY IN THE DISCUSSION MEASURES  
BY GROUPS, EXPERIMENTAL AND CONTROL

SIX SUBJECTS, EXPERIMENTAL GROUP						CLASSMATES, CONTROL GROUP				
SOURCE	SS	df	MS	F	P	SS	df	MS	F	P
Between	146.95					186.04				
Within	12.00					144.00				
Treatment	.78	2	.39	.35	>.05	24.98	2	12.49	3.36	<.05
Residual	11.22	10	1.12			119.02	32	3.71		

This is a questionable finding. If a single response unit, as defined, contained an elaboration response and an originality response, only one count was entered for the response unit, with originality taking precedence over elaboration in scoring. This technique could have excluded some scorable elaboration responses emitted by the control group during the first postmeasure.

Table IV presents a summary of the analysis of data on the written story measures for the six experimental subjects.

TABLE IV  
PERFORMANCE OF THE SIX EXPERIMENTAL SUBJECTS ON  
THE WRITTEN STORY MEASURES

SOURCE	SS	df	MS	F	P
Between	3886.67				
Within	292.00				
Treatments	208.33	1	208.33	12.45	<.05
Residual	83.67	5	16.73		

The performance of the six experimental subjects on the pre and post written measures is highly significant. The three subjects judged to be "high creatives" averaged a seven



and a half point improvement on the post measure. Those subjects judged to be "low" creatives averaged a nine point improvement on the postmeasure. The significant difference in performance of the experimental subjects supports the hypothesized increase in creative verbal behavior on a written measure.

Table V represents an analysis of the data on the control group's written measures.

TABLE V  
PERFORMANCE OF THE CONTROL GROUP  
ON THE WRITTEN STORY MEASURES

SOURCE					
Between	6177.72				
Within	961.50				
Treatment	132.03	1	132.03	2.38	>.05
Residual	829.47	15	55.29		

There was no significant difference between pre and post written measures for the control group.

Interjudge reliability coefficients were obtained using an analysis of variance design. Table VI presents the calculated coefficients.

TABLE VI  
JUDGE RELIABILITY COEFFICIENTS

CRITERIA	PRE MEASURE	POST MEASURE 1	POST MEASURE 11
Fluency	.99	.99	.90
Originality	.88	.92	.89
Elaboration	.93	.76	.89
Stories	.54	.64	--

NOTE: An  $r$  of .51 is significant at the .01 level.  
Interjudge reliability coefficients on all measures were significant at the .01 level.

The following hypotheses were originally proposed:

1. As a result of having received reinforcement for creative verbal behavior in training sessions with the dummy, the probability of making a creative verbal response for each of the six subjects will be increased, and this training will generalize to two classroom discussions, in which the subjects will emit more creative responses after training than in a similar discussion before training.

This hypothesis was not supported by the data. There was no significant difference in the performance of the six subjects on any of the three creative verbal behavior criteria of fluency, originality, or elaboration.

2. The increase in the six subjects' creative verbal behavior will also appear in a written posttraining measure, as judged relative to a written pre-training measure.

This hypothesis was supported by the data. The six subjects showed a significant increase in creative verbal behavior on the posttraining written measure.

3. With the increase in creative verbal behavior of the six subjects in the postmeasure class discussions,

and the delivery of teacher reinforcement (social approval) contingent on a creative response, there will be an increase in the creative verbal behavior of the other children in the classroom on the post-measure discussions, as compared to their performance on a similar premeasure discussion.

This hypothesis received partial support. On two criteria of creative verbal behavior, those of elaboration and originality, the members of the control group showed an increase in the discussion measures. However, the increase cannot be attributed to the effect of the creative contributions of the six experimental subjects on discussion postmeasures, as hypothesized, as there was no increase for those subjects shown in the data. A discussion of other variables that might have effected the control group's verbal behavior will appear in Chapter V.

It can be inferred from the data that it is possible to shape creative verbal behavior in fourth grade children through positive social reinforcement to the extent that their written behavior will show greater creativity. It seems that this finding could be generalized to include the probability of shaping written creative verbal behavior in children in all secondary grades.

## CHAPTER V

### DISCUSSION

This chapter includes a discussion of the following topics: (a) limitations of the study and the consequent qualifications of conclusions, (b) correspondence and extension of findings from similar studies, (c) some practical applications drawn from supportive data, and (d) suggestions for future research.

#### I. LIMITATIONS OF THE STUDY AND QUALIFICATIONS OF CONCLUSIONS

The most significant finding and greatest conclusiveness in the data was in the six experimental subjects' increase in creative verbal behavior on the story postmeasure. Of the training procedures, the only one to be presented three times during the training period was an exercise calling for the subject to provide a variety of endings to the stimulus of an unfinished story. There is a probability that the repetition of this procedure had a minor training to the task effect on the written postmeasure, although making up an ending to a story is a less complex response than writing an original story from beginning to end. However, the appearance of creative verbal behavior in a written measure rather

than in a classroom discussion measure is in keeping with the characteristics of the creative child cited in Chapter II. Some of these characteristics are the ability to fantasize, the valuing of humour, and the desire to function independently. Although instructions to be original and imaginative preceded both written and discussion measures, writing a story might have greater discriminative stimulus and reinforcing value for behavior related to these characteristics than participating in a classroom discussion. The transfer of training from sessions in creative verbal behavior with the dummy to the writing of a story could be explained in terms of greater similarity of stimuli between a one to one relationship with the dummy and a compliance to a request to write a creative story, than to a request to respond creatively in a group discussion. The inclusion of some group interaction among two or more of the subjects and the dummy might have facilitated transfer to a classroom discussion. There is the possibility that a warm friendly adult could have been used instead of a dummy in the training sessions, providing greater likelihood of the teacher in a classroom becoming a discriminative stimulus for creative verbal behavior. While the use of a dummy works no magic and is only as positively reinforcing or as aversive as the experimenter controlling it, the reaction of the six subjects to

the dummy would indicate that the dummy is less inhibiting than an adult to the production of imaginative ideas. The increase in creativity on the story measure could indicate that the emitting of creative verbal responses becomes intrinsically reinforcing, and that teacher approval for a response made in class is not as positively reinforcing as self reinforcement.

Data showed that the control group emitted more original and elaborative responses on the postmeasure discussions than did the experimental subjects. The data did not offer evidence that this was due to the effect of an increase in creative contributions of the six experimental subjects. That the data did not show the expected increase in the subjects' creative verbal behavior might be due to the grossness of the discussion criteria for evaluating responses. In order to produce criteria that would be realistically usable and operationally defined, many aspects of verbal behavior were excluded from scoring. It was the subjective judgment of the fourth grade teacher and a psychology department faculty member, both of whom were present at all three discussion measures, that there was an obvious difference in the first postmeasure as compared to the premeasure. This difference was largely in terms of student attitude. On the postmeasures, particularly the first, the students' behavior indicated that they were having a good time, participating freely and

imaginatively, yet relevantly, and refraining from criticizing the contributions of others. It is possible that while the six subjects did not show an increase in creative verbal behavior scorable according to the criteria, there was an unmeasured change in verbal behavior that served as a discriminative stimulus for greater creativity in the verbal responses of the classmates. In a classroom situation there are many variables that are not under the investigator's control, such as inconsistency in teacher reinforcement, and the presence or absence of a few verbally critical and aversive children on a given discussion day. The effects of these variables upon the children's creative verbal behavior were not accounted for.

## II. SUPPORT AND EXPANSION TO THE FINDINGS OF OTHER STUDIES

Cited in Chapter II are other studies that have used a dummy for the delivery of positive social reinforcement and have found the dummy to be a highly effective reinforcer. Previous studies with a dummy have been done exclusively with nursery school children for subjects. This study demonstrated that the dummy is an effective reinforcer when used with more sophisticated fourth grade subjects. Data to support this conclusion came from the verbal reports of the subjects. During the training sessions the assistants recorded many



favorable comments made to them by the subjects about the dummy. After the first session, the subjects indicated that they knew who the dummy really was and how the apparatus worked, but this knowledge did not appear to affect their interaction with the dummy. They responded more freely to the dummy than they did to the experimenter outside of the experimental setting. Following the last session, an interview was held with the six subjects. All of the subjects stated that they would like to have an opportunity to spend more time with the dummy. It was with one subject in particular that the dummy developed a rewarding relationship. This was a child, one of the "low" creatives, who had never talked in school, even to never having greeted his teacher. His responses were minimal during the first few days of training, but by the sixth day, he was responding to the dummy with short sentences, rather than single words, and talking freely to the assistants while going to and from the classroom. That the dummy was successful in establishing verbal communication with this child, adults having tried and failed, would tend to support Baer's contention that a child relates more freely with a dummy because it has no initial aversive stimulus value. The rapport established with this nonverbal child might well have been achieved by an attentive accepting adult, but perhaps the use of the dummy facilitates

the forming of a relationship with some children, such as the subject just described. The possibility of the dummy conducting therapeutic interviews with children who are not easily reached by adults suggests some interesting extensions of the dummy's usefulness.

### III. IMPLICATIONS FOR PRACTICE

An advantage gained from using an aspect of classroom performance as a measure, despite the uncontrolled variables that would not be found in other assessments, is that implications for practice to educators in schools follow more logically and justifiably from the findings. The data confirmed that positively reinforcing creative verbal behavior would increase the probability of its being emitted in a written measure. Writing is a fundamental classroom language exercise. Although a teacher does not have a friendly dummy to deliver reinforcement, there are some implications for teaching present in this study's findings. A teacher can use the techniques of operant conditioning to shape desired creative classroom behavior, providing that the creative behavior can be defined, and that social approval is a positive reinforcer to the students. The teacher can also extinguish the highly critical students and shape an accepting attitude in the class members, so that they will deliver positive social reinforcement for creative behavior. Beginning in the

secondary grades, peer approval is known to be a highly effective reinforcer, and an accepting atmosphere in the classroom is conducive to creativity. Given six-hour training sessions over a nine-month period, the opportunities for reinforcing creative behavior should be plentiful, and the effects of positive social reinforcement significant.

#### IV. SUGGESTIONS FOR FUTURE RESEARCH

Although there are limitations inherent in research done in an educational setting, a replication of this study should include in its design (a) more training sessions with the experimental subjects (b) a method of assessing the contribution to a classroom discussion of aspects of verbal behavior not detected by the original criteria, perhaps by having the classmembers rate each discussion and give reasons for their ratings, and (c) use of a random sample of the classroom population as subjects. A replication of the study should provide for keeping a cumulative record of subjects' creative verbal responses during training. Training session tapes from this study are being kept and will eventually be judged, providing additional data relevant to both this study and any future attempts at replication.

## V. SUMMARY

An attempt was made to shape creative verbal behavior in six fourth grade subjects, three of whom were, by teacher judgment, "high" creatives, and three of whom were "low" creatives. The subjects spent ten sessions averaging eighteen minutes a session with a mechanized talking dummy. The dummy provided verbal stimuli in the form of word games and positively reinforced creative verbal responses made to the stimuli. The performance of the six subjects was compared to their classmates' performance on a discussion premeasure and two discussion postmeasures, as well as a pre and a post written measure. The six experimental subjects' creative verbal behavior increased significantly on the written measures. The control group showed an increase on two of the three criteria of creative verbal behavior on the discussion measures. Creative verbal responses are considered to be complex behavior, yet this research demonstrates that such behavior can be operantly conditioned and does generalize from the experimental setting to the classroom.

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